



Patent  
TH1871Y (US)  
RBT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of )  
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WYNDHAM H. BOON; and )  
CHRISTOPHER J. SMITH )  
Serial No. 10/074,834 ) Group Art Unit: 1751  
Filed February 13, 2002 ) Examiner: Ogden Jr., N.  
A NOVEL CHEMICAL BASE FOR FUEL )  
CELL ENGINE HEAT EXCHANGE )  
COOLANT/ANTIFREEZE )  
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)

COMMISSIONER FOR PATENTS  
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Sir:

**DECLARATION UNDER 37 CFR §1.132**

Glenn Komplin declares as follows:

1. I am employed by Shell Global Solutions (US) Inc. as a Staff Research Engineer.
2. I received a Bachelor of Science in Chemical Engineering from the University of Wisconsin, Madison in 1984, and a Ph.D in Material Science from the University of Wisconsin, Madison in 1990.
3. I performed an experiment designed to measure the conductivity of aqueous solutions of 1,3-propanediol and deionized water. I prepared 3 solutions of 1,3-

propanediol/deionized water—1) a solution of 80 wt.% 1,3-propanediol and 20 wt.% deionized water; 2) a solution of 50 wt.% 1,3-propanediol and 50 wt.% deionized water; and; 3) a solution of 20 wt.% 1,3-propanediol and 80 wt.% deionized water. I then measured the conductivity of the three solutions at 24°C with an Orion Model 115 conductivity meter. The results are shown in Table 1 below where 1,3-propanediol is denoted as PDO and deionized water is denoted as DI water.

TABLE 1  
(Conductivity of 1,3-propanediol/deionized water solutions in  $\mu$ Seimens/cm)

<b>80% PDO/20% DI water</b>	<b>50% PDO/50% DI water</b>	<b>20% PDO/80% DI water</b>
0.8	2.2	4.3

4. I performed an experiment designed to measure the conductivity of aqueous solutions of 1,3-propanediol and tap water. I prepared 3 solutions of 1,3-propanediol/tap water—1) a solution of 80 wt.% 1,3-propanediol and 20 wt.% tap water; 2) a solution of 50 wt.% 1,3-propanediol and 50 wt.% tap water; and; 3) a solution of 20 wt.% 1,3-propanediol and 80 wt.% tap water. I then measured the conductivity of the three solutions at 24°C with an Orion Model 115 conductivity meter. The results are shown in Table 2 below where 1,3-propanediol is denoted as PDO.

TABLE 2  
(Conductivity of 1,3-propanediol/tap water solutions in  $\mu$ Seimens/cm)

<b>80% PDO/20% tap water</b>	<b>50% PDO/50% tap water</b>	<b>20% PDO/80% tap water</b>
9.2	72.5	273

5. The electrical resistivity of the 1,3-propanediol/deionized water solutions and the 1,3-propanediol/tap water solutions in ohms-cm may be calculated by dividing 1 by the conductivity of these solutions. The electrical resistivity in Kohm-cm may be calculated from the electrical resistivity in ohm-cm by dividing the electrical resistivity in ohm-cm by 1000. The calculated electrical resistivity of the 1,3-propanediol/deionized water solutions and the 1,3-propandiol/tap water solutions in Koh-cm is shown in Table 3 below, where 1,3-propanediol is denoted as PDO and deionized water is denoted as DI water.

TABLE 3  
(Electrical resistivity of 1,3-propanediol water solutions in Kohm-cm)

	80%PDO/20% water	50%PDO/50% water	20%PDO/80%water
DI water	1250	455	232
Tap water	108	14	4

Glen C Kompli

Date: December 4, 2006